

REVIEW

Лесотехнически университет
Агрономически факултет
№ АФ-7632
СОФИЯ 10.10.2024г.

on the materials for participation in a competition for the occupation of the academic position "professor", field of higher education 6. Agricultural sciences and veterinary medicine, Professional direction 6.1. Plant breeding, scientific specialty "AGROCHEMISTRY", in the discipline "AGROCHEMISTRY", announced by the Forestry University in SG no. 59/12.07.2024/, procedure code AGR-P-0524-132. Candidates for participation in the competition are:

Associate Professor: Assoc. Prof. DSc VESELIN ILIEV KUTEV;

Reviewer: IVAN DIANKOV PACHEV PhD, PROFESSOR of PN 6.1 Plant breeding, scientific specialty AGROCHEMISTRY

The review is presented in my capacity as:

- a member of the Scientific Jury appointed by order ZPS - 515/18.09.2024, of the rector of the Forestry University, Sofia, on the basis of a decision of the FS of the AF (protocol No. 9/21.06.2024) according to a report by the Dean of AF and Art. 61. paragraphs 1 and 2 of the LTU PRAS (Adopted by the LTU Board of Directors on 14.04.2011) for the terms and conditions for filling the academic position "PROFESSOR" according to a competition announced by LTU for the needs of the department of "AGRONOMY" at the AF in the area of higher education 6. "Agrarian sciences and veterinary medicine" professional direction 6.1. "Plant breeding" the scientific specialty "Agrochemistry" in the discipline "Agrochemistry" promulgated in SG no. 59/12.07.2024, procedure code AGR-P-0524-132.

1. Brief biographical details of the applicant(s).

During the period 1982-1987, he completed higher education at the State Agrarian University "V. V. Dokuchaev", Kharkiv, Ukraine ▪ Agronomist, agrochemist, soil scientist - DVO 014504 from 30.01.1987 with honors ▪ Diploma thesis on the topic "Influence of different phosphate levels on the efficiency and degree of use of nitrogen fertilizers in the conditions of typical chernozem (with ^{15}N)" - performed in the "Agrochemistry" department. In 1988, he became a doctoral student at IPAZR "N. Pushkarov" and in 1995, defended a dissertation on the topic: "Investigation of nitrogen mineralization in the conditions of laboratory, vessel and microfield experiments (with ^{15}N)". With a decision from protocol 10, No. 3 of 31.01.1995, the Higher Attestation Commission was awarded the scientific degree "Candidate of Agricultural Sciences" Diploma No. 23487 dated 03/06/1995. Doctoral dissertation defended on the topic: "Geostatistical approach to the study of the spatial variation of soil indicators for the needs of agrochemical studies and agriculture" ▪ Diploma of AA No. 0005 of 27.06.2013.

2011-2012 Associate Professor, Institute of Mathematics and Informatics, BAS, Sofia (Second employment contract) 2014-2016 Associate Professor of Agrochemistry, LTU, Sofia; Faculty of Agronomy, Department of Agriculture and Herbology 2016-2019 2019-2024 Head of the "Agriculture and Herbology" Department Associate Professor of Agrochemistry, LTU, Sofia; Faculty of Agronomy, Department of Agronomy 2024 VRID Head of Department "Agronomy". He speaks Russian, French and English. Head of numerous national and international projects, which gave him the opportunity to acquire organizational skills and subsequently organize international scientific conferences.

2. Conformity of the submitted documents and materials of the candidate/s with the requirements according to the Regulations for RAS at LTU;

In the competition for the academic position of "PROFESSOR", Associate Professor Veselin Kutev presents scientific production and publication activity after receiving the academic position of "ASSOCIANT PROFESSOR".

Indicator A: dissertation work for awarding the educational and scientific degree "Doctor" (defended) 50 points (required 50 points);

Indicator B: Habilitation thesis - scientific publications (not less than 10) in publications that are referenced and indexed in world-renowned databases with scientific information 121.7 (required 100 points);

Indicator C: Published monograph, which is not presented as the main habilitation thesis - 16.7; - Published books based on protected dissertation works for awarding the educational and scientific degree "Doctor" and for awarding the scientific degree "Doctor of Sciences" - 80; - Articles and reports published in scientific publications, referenced and indexed in world-famous databases with scientific information - 174.8; - Articles and reports published in non-refereed peer-reviewed journals or published in edited collective volumes – 51.1; **TOTAL POINTS BY GROUP OF INDICATORS "D": 342, (200 points required);**

Indicator D: Citations or reviews in scientific publications, referenced and indexed in world-famous databases with scientific information or in monographs and collective volumes - 225;

Indicator E: - Obtained scientific degree "Doctor of Sciences" - 40; - Supervision of a successfully defended doctoral student (n is the number of co-supervisors of the relevant doctoral student) – 120; - Participation in a national scientific or educational project – 15; - Participation in an international scientific or educational project – 20; - Management of a national scientific or educational project – 60; - Management of an international scientific or educational project – 160; - Published university textbook or textbook that is used in the school network – 10;

TOTAL POINTS BY INDICATOR GROUP "E": 425

The total number of points is 1163.1 out of the required 600, which are fulfilled 100% and exceed by 52% the minimum national requirements for the scientific-research, teaching-teaching and expert activity of the candidate Assoc. Prof. Dr. Veselin Kutev for occupying the academic position "PROFESSOR".

3. Evaluation of the educational and teaching activity of the candidate/s

Assoc. Dr. Veselin Kutev leads lectures and exercises in the discipline "Agrochemistry" for second-year full-time and part-time students of the specialty Agronomy, Plant Protection and general Horticulture of the educational and qualification degree "Bachelor" - full-time study of the specialty "Plant Protection". Lectures on Horticulture for full-time and extramural studies of the educational and qualification degree "Bachelor". In the discipline of agricultural technology and fertilization, he leads lectures and exercises of the educational and qualification degree "Master", as well as in the discipline of "Precision plant breeding" and "Management of organic residues" to students of full-time and part-time studies.

The presented curriculum envisages the study of modern theoretical positions on plant nutrition and methods for characterizing the ability of different soils to supply agricultural crops with nutrients. Nutrition and fertilization of plants with individual elements - nitrogen, phosphorus, potassium, trace elements - are considered. Modern methods for determining fertilization needs, types and forms of fertilizers, the specificity of fertilization of different groups of crops are studied. Particular attention is paid to the effect of fertilization on disease and pest attacks and to the environmental problems of fertilization. In the practical exercises, laboratory determination of the main agrochemical parameters of soils is foreseen; In the General Plant Breeding discipline, students are given the opportunity to get to know and acquire specific theoretical knowledge about the economic importance, origin and distribution, systematics and varieties regionalized in the country of the main field species, grouped into the following groups: cereals, legumes, technical and tuber crops. The lecture material and exercises are structured in such a way that the students become familiar with the morphology, peculiarities of growth, development and their biological requirements to environmental factors, consistently gain knowledge about the productive possibilities of individual agricultural species.

4. Evaluation of the candidate's scientific, applied scientific and publication activity

4.1. Participation in scientific, scientific-applied and educational projects

For participation in the competition for "Professor" Assoc. Prof. V. Kutev has presented 8 projects, of which 2 national and 4 international - of which he is the head and participation in 2 educational projects. Assoc.Prof. Kutev is the coordinator for Bulgaria of the project from the EU's Sixth Framework Program - FOOD-CT-2004 003375 "OPENING OF COMMUNICATION CHANNELS BETWEEN THE ASSOCIATED CANDIDATE COUNTRIES AND THE EU IN ORGANIC AGRICULTURE" 2004-2006; a project financed by the Ministry of Foreign Affairs of Greece - "GREEK-BULGARIAN COOPERATION FOR CONSERVATION AND MANAGEMENT OF NATURAL RESOURCES - 2004 - 2006";

Project leader BUL/017/06, financed by the Flemish government for Bulgaria - "Implementation of the food balances of FARM GATE in Bulgaria: A tool for managing sustainable agriculture".- 2007-2010. Project manager at the National Agricultural Fund - Contract DNTS/Austria 01/2 of 23.08.2017 - "Distribution of nutrients in the soil during intensive cultivation of vegetables with fertigation and optimization of crop nutrition to reduce the impact of fertilizers on the environment". Competition for projects under bilateral cooperation programs 2016 - Bulgaria - Austria. Prof. Kutev is also the head of 2 nationally funded scientific projects: NFNI No. INOV_09_0004 on the topic "Research of the spatial variation of nutrients in the conditions of intensive vegetable production. using fertigation to optimize crop nutrition and reduce the impact of used fertilizers on the environment" - 2011-2013. Contract No. 20 of 2016: "Movement of nitrates in the soil under conditions of fertigation under the background of mineral and organic fertilization of vegetables." The participation of Associate Professor Dr. Kutev is related to 2 projects: One international project: SEE/A/118/2.2/X MONITOR II Practical use of monitoring in natural disaster management. MONITOR II is supported by funds from the European Regional Development Fund (ERDF) - IMI, BAS - 2011-2012 and national NFNI No. INOV_09_0004 on the topic "Investigation of the spatial variation of nutrients in conditions of intensive vegetable production using fertigation to optimize nutrition of crops and reducing the impact of used fertilizers on the environment " - 2011-2013. The topic of the projects is directly related

to scientific research and the scientific and teaching work of Associate Professor V. Kutev. The main searches concern the ways to achieve sustainable agriculture, organic production, soil nutrient balance, climate change and soil monitoring, fertigation and balanced plant nutrition and precision agriculture.

4.2. Characteristics of published scientific results

The publications submitted for review are evidence of the high level of research work and excellent academic training of the applicant, the applied modern, innovative and adequate research methods and the competent work with software products such as Statgraphics, Sigma Plot, GS+ Geostatistics for the Environmental Sciences software by Gamadesign Software etc. The majority of the presented materials are related to the leadership or participation of Associate Professor V. Kutev in national and international projects (B4.4; B4.6; G7.14; G7.15; G8.13; G8.14), as well as with doctoral studies. A significant part of the articles have been published in internationally known and prestigious journals, referenced and indexed in Scopus and/or Web of Science. 14 of the submitted articles or 30.4% have impact rank (SJR) and 10.9% have impact factor (IF).

The research work included in the peer-reviewed articles belongs to several areas:

1. New and traditional systems for fertilization and fertigation of field and vegetable crops, based on both local and international experience and cooperation. Nutrient behavior in the main soil types. (publications - B4. 11; G7.3; G7.4; G7.5; G7.13; G8. 8; G8.9; G8.12; G11).
2. Testing under field and vegetation conditions of new and promising varieties of agricultural crops and fertilizers depending on the type and method of application (G7.9; G7.16; G8.1; G8.2; G8.4; G8). .17; D8.19).
3. Maintaining sustainable yields, fertilization, irrigation and quality of production and the environment in conditions of climate change (B4.9; D6.1; D7.11; G7. 10; G7.12; G8.10; G8. 18;)
4. The role of the anthropogenic factor in managing emerging situations. Concepts of the influence of hydrological, meteorological conditions and climate change, as well as the role of land and space cover and its use in the occurrence of climate anomalies (B4.1, B4.2, B4.3, B4.7, B4.8, G7.1, D8.15) are discussed.
5. Through geostatistical analysis, a monitoring network was built in the field of precision agriculture, by determining the spatial variations of available forms of N,P and K, as well as organic carbon in the soil profile and in the horizontal around the irrigation line (B4. 5; B7.7; D7.6; D8.11).
6. Associate Professor V. Kutev's participation in design and contractual developments has a strong impact on his work as the head of the Bureau for the Transfer of Technological Solutions in Agriculture, as well as as a result of numerous contacts with farmers during research, analysis, evaluation and recommendations at the farm level. (G5; G7.8; G8.5; G8. 6; E23.1).

4.3. Reflection of the candidate's scientific activity in the literature (citability)

According to the reference for citations, with the required 100 points for indicator D13, Associate Professor Kutev has 225 points, which exceeds the citation criteria, with 15 citations

presented. Prof. Kutev has presented only citations in scientific journals, referenced and indexed in the world database. Citations to non-refereed peer-reviewed journals are not provided. The presented citations are from journals that are peer-reviewed and referenced in Scopus and Web of Science, with 46.7% being in journals with a high scientific rating (Q1 and Q2). Open citations in IF journals are 53.3% of the total number of citations presented with the papers.

4.4. Contributions in the works of the candidate/s (scientific, scientific-applied, applied)

In the announced competition for the appointment of a scientific position of professor at the Department of Agronomy, scientific specialty "Agrochemistry", in the discipline "Agrochemistry" for the needs of the Faculty of Agronomy of the Forestry University, Prof. Veselin Kutev presented 46 reports corresponding to scientific research and the applicant's publication activity. Submitted contributions reflect creative and professional knowledge, experience and ability to work in a team with diverse professional interests. I highly appreciate the qualities of Associate Professor V. Kutev in the field of statistics and skills in working with various software products, as well as his participation and contribution in project No. 942 of the competition for financing fundamental scientific research at the NI fund. Perhaps Associate Professor Kutev should have emphasized in more detail the statistical methods used and the fact of their equal applicability in agrochemical research.

I can divide the contributions of his work as a researcher in the field of agriculture as follows:

Scientific contributions

1. The results of hydrological modeling show a decrease in snow cover, which leads to a decrease in the water resource from snow - an indicator of changes in hydroclimatic conditions in winter. Changing hydrological conditions led to lower rye yields and relatively stable to increased triticale yields over the time period considered (D11,16)
2. Copernicus Earth Monitoring Service data, NCEP Reanalysis, EFAS-EC (European Flood Awareness System), IMERG-NASA (Integrated Multisatellite Retrievals for GPM), national data and CLM modeling (B4, 1)
3. An assessment was made of the expected changes in the water resources of Bulgaria, caused by the shift of the main precipitation to the warm seasons for the rivers of Struma and Mesta by applying a hydrological model of precipitation and runoff, which is a sub-model of the NASA climate model (B4 .8; D11.15).
4. Numerical data related to the study of the spectrum of ion density variations in the magnetosphere related to gas dynamics were processed. The results of the passage of a satellite in the upper zone of the magnetosphere are obtained and the variations of the parameters along the trajectory of the satellite are studied, and the solution of the model is achieved as a result of self-consistent interaction between the modules of the magnetosphere and the magnetosphere (B4.7; G7.1)
5. The genetic structure of plant height in a set of 358 European winter wheat cultivars and 14 spring wheat cultivars was studied based on field data in eight countries. (G11:4)

6. Original results were obtained for the change in the NDVI index and the state of wheat and rapeseed crops before wintering. Mapping allows more accurate determination of nitrogen fertilizer rates in different parts of the field. The real contents of nitrogen, phosphorus and potassium in the main soils of Eastern Bulgaria were investigated. The test for the frequency distribution of inorganic nitrogen in the soil allows you to determine the value that should be excluded from the calculation of the fertilizer rate - 30 kg of nitrogen per hectare. Results higher than 30 mg P_2O_5 .100 g⁻¹ and 35-40 mg K_2O .100g⁻¹ are deviations from the normal distribution of samples and such soils do not need fertilization with phosphorus and potassium (B4.5; (G7. 5)

7. A statistical analysis of the observed variable - mineral nitrogen - was carried out. Descriptive statistics and the Shapiro-Wilk normality test were calculated. Based on the calculated statistics, the observed variable was found to have a normal distribution, which also suggests adequate nitrogen fertilization (G11.8).

Scientific - applied contributions

8. The main parameters of the environment affecting the replenishment of water resources in our country through snowfall for the South Central region were studied. Results were obtained for winter precipitation over a period of 22 years and its influence on winter crop yields (B4.2; B4.3)

9. The organic carbon content after manure application in light soil decreased in depth of the soil profile, 2.12%, 0.55% and 0.42% per 30 cm, respectively, and after two years there was a significant downward movement in soil organic carbon profile – 1.69%, 1.55% and 1.47%, respectively, which differs from the notion that there is no strong washing of organic matter out of the soil profile (G7, 2)

10. Original data were obtained in experiments with fertigation and fertilization based on ortho- and polyphosphoric acids and various forms of nitrogen fertilizers on the growth indicators, yield and quality of zucchini, onions and salads. The role of polyphosphates for vegetable crops compared to orthophosphate fertilizers under conditions of fertilization with different nitrogen fertilizers has been established. The NDVI index was measured and related to applied nitrogen fertilizers and background phosphorus. (G7.4; B4.11; G7.11; G7.12; G7.13; G18).

11. When 100 old and modern varieties of common wheat were tested without the use of fertilizers for determining the straw:grain ratio, results were obtained ranging from 1.51 to 2.18. Erythrosperrum and Ferrugineum have a low ratio of 1.51-1.52. Milturum, Lutescens and Graecum have a high ratio of 1.80-1.94. The varieties from the two selection centers in our country differ greatly, the ratio for the varieties from Sadovo is 2.18, and for General Toshevo it is 1.55. C) Presence of donkeys is a factor in variation. The ratio of straw: grain in the seeded varieties is 1.53, and in the seedless varieties - 1.88. Determination of NPK fertilizer rates is influenced by the straw:grain ratio of wheat. Nitrogen fertilizer rates vary from 16.5 to 18.5 kg N per hectare. In the case of phosphorus fertilizers, this variation is from 6.5 to 7.5 kg P_2O_5 per hectare. The rates for fertilizing with potassium vary the most, 14.5 to 19.3 kg K_2O per hectare. (G11.1; G11.2)

12. A survey of the lands in North-West and North-Central Bulgaria shows that the average load of agricultural lands with residual mineral nitrogen is the highest in the Vidin region - 41.5 mg/kg soil, the lowest in the Montana region - 20.9 mg /kg of soil. mg/kg soil. Pleven region

has the most cases of extremely high residual amounts of mineral nitrogen. In terms of total amounts of potentially exported nitrogen into the environment from the studied areas, the largest amounts are in Pleven district - 9047 tons for spring crops and 6254 tons for winter crops, and the least in Lovech district - 2035 tons for spring crops and 1320 tons for winter crops. On average, losses of about 52 kg of nitrogen per hectare are possible for the studied areas. (B4.9; D7.8)

13. A study in the conditions of a three-year crop rotation showed the effectiveness of the following nitrogen rates: sunflower - N12 kg/ha, wheat - N10 kg/ha, maize - N10 kg/ha. A single application of P36K36 kg/da is more effective than an annual amount of P12K12 kg/da (G7.5)

14. The variation of fertilizer rates in the spatial heterogeneity of soil fertility was investigated in a resin for the application of precision agriculture. The results obtained with variable rate fertilization in barley and sunflower show that significant savings in nitrogen and potassium fertilizers can be achieved. For barley, the fertilizer norm for nitrogen is from 6.5 to 11.0 kg/da, and the norm for potassium from 1.0 to 7.5 kg/da. For sunflower, the fertilizer rate for nitrogen varies from 1 to 9 kg/da, and the rate for potassium from 1 to 9 kg/da. For both crops, phosphorus fertilization rates can be reduced by 50% or more to only about 10% of the area (G11.3)

15. Through soil-climatic information, a permanent monitoring network of resins of 36 points distributed in a simple grid was built. There is a strong correlation of spatial variability between P and K. Phosphorus and potassium depend on soil formation processes and the prevailing bedrock. Differences in nitrogen are due to the application of nitrogen fertilizer. Spatial variability of soil organic matter in the conditions of resin plant monitoring networks shows in the Glumche network connectivity with different hydrological and relief conditions in a flat area. Spatial variability of humus in the Babalia network is related to soil erosion processes in hilly areas. Spatial dependence of humus in both fields is strong (G7.6, G7.7, G11.6, G11.7)

16. The growth manifestations of arugula, lettuce, wheat and oats have been checked by the influence of new and promising fertilizers: organic liquid fertilizer "Extra Force"; three types of liquid organic fertilizers with single and double application (in 14 days) - "Extra Force", "Zinoviy Korn" and "Zinoviy Oil"; organic fertilizers based on alfalfa extracts with foliar application - Sila Max, Sila and Sila B+Mo; as well as "Eco Prop", "Biostar Top", StimAK, "Azarii" and "Ermey" fertilizer products (G7.9; G7.16; G11.17; G11.19)

17. A slight acidification of the soil was found during fertigation in the control variant and when using compost. When manure is applied, acidification is insignificant (Y7.10)

18. The good potential of using multispectral cameras to assess forest damage by *Ips typographus*, *Ips acuminatus* and *Ips sexdentatus* beetles has been demonstrated. The NDVI index in the range of 0.7 to 0.95 characterizes green tree vegetation. Affected forests under stress have lower values of the NDVI index – 0.65. The NDVI index of damaged areas ranges from 0.45-0.5 (B4.10).

5. Evaluation of the candidate's personal contribution

I have known Veselin Kutev since 1982, i.e. from our student years in Kharkiv, Ukraine. Since he started working at the "N. Pushkarov" Institute of Soil Science, I have had many professional

contacts with him. I know him as a good colleague, with excellent professional training, innovative thinking, desire to work and willingness to share responsibilities. I was also a reviewer of his PhD thesis. As the head of the Bureau for the transfer of technological solutions in agriculture at IPAZR "N. Pushkarov", Prof. Kutev showed high competence and skill in the practical implementation of his scientific knowledge. I participated in a scientific jury of one of his doctoral students and I can confidently state that his contribution and support in the preparation, conduct and defense of the dissertation was great, as well as from the review of all documents accompanying the procedure. I highly appreciate the personal contribution of Prof. Dr. Veselin Iliev Kutev to the scientific production presented to me for evaluation.

6. Critical notes and recommendations

I have no critical remarks about the scientific-research work, teaching-teaching and expert activity of Associate Professor V. Kutev. I can only allow myself to suggest that he summarize all the data of his research work for the writing of a monographic work, since the issues under consideration are important both from the point of view of agrochemistry and production.

7. Personal impressions

My personal impressions are more than good! A good colleague, a good scientist with excellent professional training, innovative thinking, willingness to work and willingness to share responsibilities. I believe that Associate Professor V. Kutev is a highly prepared and erudite scientist and teacher with a presence in the scientific life of the country as the author of significant publications with original contributions.

8. Conclusion

The analysis of the activity of Assoc. Prof. Veselin Iliev Kutev on the basis of ZRASRB and the regulations for the development of the academic staff at the Forestry University significantly exceed the minimum required points for obtaining the academic position "PROFESSOR". Interests in various fields, such as scientific research and publication activity (publishing monographs, books, studies and articles), in teaching - teaching (developed lecture courses and training programs for exercises) and expert activity show professional experience, creative potential and high culture in his activity. Bearing in mind the above, with full conviction I vote "FOR" in the scientific jury and PROMOTE to the Faculty Council of the Faculty of Agronomy at the Forestry University, Sofia the candidate DOC. VESELIN ILIEV KÜTEV to take the academic position of "professor" in the discipline "Agrochemistry" from MON 6.1. Plant breeding Reviewer

Signature:

/Prof. Dr Ivan Pachev PhD/

Review submitted to: 7.10.2024